

RIPPLES NEWSLETTER

**ISSUE 4
SPRING 2014**



**Department of Physics and Astronomy and
the Center for Gravitational Wave Astronomy**
utb.edu/cgwa

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TEN YEARS OF THE CENTER FOR GRAVITATIONAL WAVE ASTRONOMY

Excerpts from UTB News and Information.

The Center for Gravitational Wave Astronomy (CGWA) was officially founded in 2003 with a \$5 million University Research Center grant from the National Aeronautics and Space Administration. The National Science Foundation awarded a \$5 million Centers of Research Excellence in Science and Technology grant to continue the center's mission from November 2012 to October 2017.

The history of the CGWA began before 2003 when Dr. Mario Diaz joined The University of Texas at Brownsville in 1996 shortly after the university's undergraduate degree in physics had been approved by The University of Texas System. Since its founding the center has generated more than \$30 million in federal funding through faculty members and grants. The center generates at least 50 publications in international refereed journals a year. The center supports 13 faculty members, seven doctoral students, 20 master's degree students and 11 undergraduate students.

CGWA commemorated 10 years of research with a public Science Festival and celebration on Saturday, Oct. 12 at the UTB Student Union.

"Science festivals are designed to engage the community through inspiring celebrations of the fascinating world of science and technology," said Dr. Joey Shapiro Key, Director of Education and Outreach for the Center for Gravitational Wave Astronomy. "The community is invited to participate in fun events and interact with scientists and engineers showcasing art and science collaborations and innovative ways to communicate science topics. We want everyone to have access to the exciting science work that is happening right here in our community."



The celebration included music, food, talks, UTB's Society of Physics Students performing a Physics Circus and solar observing at the Nompuewenu Observatory. Moises Castillo, a graduate student in physics from Los Fresnos, helped create the Physics Circus fire tornado using blowers, flammable liquid, and a large metal tub to wow the crowd.

"We love science and want to share our passion with the future generations of mankind," said Castillo. "We aim to excite everyone of all ages about science."

STUDENT PROFILE

Excerpts from article in *rgVision* magazine



Jose McKinnon, 28, first became interested in science when he took his first physics course at Brownsville's Porter High School. McKinnon, a native of Tampico, Mexico and now living in Brownsville, said physics was

different at the time from other classes he took.

"It amazed me how physics problems could be applied and demonstrated in experimental measurements and mathematical analysis," said McKinnon, a doctoral student in physics in the joint degree program between The University of Texas at Brownsville and The University of Texas at San Antonio.

McKinnon has delved deeper into understanding physics working as an undergraduate, graduate and now doctoral student at CGWA. He has attended workshops and conferences in San Antonio, Washington, D.C. and Italy and did summer internships in 2012 and 2013 at the NASA Goddard Space Flight Center in Maryland. During this time he developed a coding for galaxy density distribution modeling and gravitational hybridization waveform modeling.

"I know all this sounded a little complicated, but in reality it was and that's what research is all about and the passion I have made me accomplish this work," said McKinnon. "I have learned a lot all these years during my research and work at the CGWA."

RESEARCH HIGHLIGHTS

- **Dr. Ahmed Touhami** received a \$276,233 grant from the National Science Foundation (NSF) Major Research Instrumentation Program for the acquisition of a top-of-the line microscopy technique. Touhami, the grant's principal investigator,



will acquire a multi-functional Integrated Fluorescence/Atomic Force Microscope to measure biophysical, chemical and physical properties at the nanoscale for single molecules.

- **Jose Guadalupe Martinez**, an ARCC Scholar in the physics department at UTB, discovered the 10th double neutron star system known to man. This unique astronomical phenomenon was discovered in the Arecibo All-Sky 327 MHz Drift Pulsar Survey on Aug. 10, 2012.
- The National Science Foundation (NSF) has awarded the CGWA a grant titled: "USA-Argentina collaboration: developing an astronomical site for Multimessenger astronomy in Cerro Macón, Argentina". The goal of this project is to establish a partnership between American and Argentine astronomers to build and operate an astronomical facility in Cordon Macon, a mountain located in the Atacama highlands of Northwestern Argentina. The grant pays for travel to Argentina by scientists and students from The University of Texas at Brownsville and Texas A&M University, the American institutions partnering in this collaboration with Argentine astronomers.
- **Dr. Malik Rakmanov** and **Dr. Volker Quetschke** were awarded a \$623,860 grant to perform research in collaboration with Dr. Xu of Rice University. The research will focus on the area of nano-photonics and to study light at the nanoscale for telecommunications and computation. The grant will enable a postdoctoral research assistant and a graduate student at the university to work alongside the professors.



- **Dr. Volker Quetschke** was awarded patent No. US 8,279,511B2, Method and Apparatus for Modulating Light. The patent arose from the research geared towards developing instrumentation for the next generation gravitational wave detector Advanced LIGO (aLIGO). Advanced LIGO challenges the limits of available instrumentation and requires advances in technology to enable the first direct detection of gravitational waves.

A NOTE FROM DIRECTOR DR. MARIO DIAZ

It is hard to believe that the CGWA is 10 years old already. It feels like yesterday when, with Joe Romano, Warren Anderson, Carlos Lousto, and Manuela Campanelli we had a dream: the dream that the opening of a new astronomical window to the universe could also be used to open the door to the wondrous adventure of science in the Rio Grande Valley.

It was a vision that looked more utopian than a clear path for the development of an academic program. But we succeeded: Thanks to the work of many faculty, postdocs, students and supporters of our center the CGWA has achieved many milestones in these 10 years. The CGWA has attracted more than \$30 million in external funding; it has created new programs, including a doctoral program in physics; it has sparked investigations that have resulted in the publication of hundreds of articles, and more importantly, it has triggered the imagination of many young minds.

But perhaps one of the best results of this collective effort has been the development of new areas of scientific research. The creation of laboratories in laser and photonics, in materials science and in radio astronomy shows that the seeds planted by the CGWA have sprouted in new opportunities for our university and the region.

Also new research centers have been created as a result of activities originated in our CGWA, like probably one of our greatest jewels in the UTB Department of Physics—the Center for Advanced Radio Astronomy (CARA). It was created three years ago inspired and triggered by activity originated in the center and has secured an agreement involving local businesses, the state, and the UT System in partnership with the innovative company SpaceX. This partnership could result in a new endeavor that could become transformational for our region.

I am sure that for the next 10 years we will have a hard time matching so many accomplishments, but I also know that there are many young researchers and dreamers willing to take the CGWA to new heights.

UPCOMING EVENTS

- **Monday Night Physics** – The first Monday of every month at 7 p.m. in Salón Cassia (Main 2.402) at UTB. Features public talks on physics and astronomy topics and is free and open to the public.
- **Physics and Astronomy Seminars** – Occurs every Friday at 1:45 p.m. in the Cavalry Conference Room. Visit the department website for a schedule of speakers at phys.utb.edu/seminars.
- **Astronomy in the Park** – The last Friday of every month at Resaca de la Palma State Park. Astronomy faculty, students, and telescopes are available for public viewing.
- **Rio Grande Science and Arts (RiSA) Festival** – Nov. 6-8, 2014 with events celebrating science and art in The University of Texas at Brownsville campus and the Brownsville Mitte Cultural District.



The University of Texas at Brownsville

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